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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/618,528	09/14/2012	Robert S. Ampulski	026757-0032P	4420
34284	7590	04/28/2017	EXAMINER	
Rutan & Tucker, LLP			CALL, DOUGLAS BRYANT	
611 ANTON BLVD			ART UNIT	PAPER NUMBER
SUITE 1400			1732	
COSTA MESA, CA 92626			NOTIFICATION DATE	DELIVERY MODE
			04/28/2017	ELECTRONIC

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte ROBERT S. AMPULSKI, JOHN T. TURNER,
and JOEL K. MONTEITH

Appeal 2016-005461
Application 13/618,528¹
Technology Center 1700

Before TERRY J. OWENS, AVELYN M. ROSS, and
MERRELL C. CASHION, JR., *Administrative Patent Judges*.

CASHION, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

This is an appeal under 35 U.S.C. § 134 from a Final Rejection of
claims 1–8, 10–18, and 20. We have jurisdiction under 35 U.S.C. § 6.

We AFFIRM.

¹ The real party in interest is identified as Sundrop Fuels, Inc., 2410 Trade
Centre Ave., Suite A, Longmont, CO 80503, USA. App. Br. 4.

Claim 1 is illustrative of the subject matter on appeal and is reproduced below:

1. A biomass composition of matter to be used in 1) a biomass gasification reaction where larger organic molecules making up the biomass are decomposed into smaller molecules to create syngas components, including hydrogen (H₂) and carbon monoxide (CO), as a product of the biomass gasification reaction, 2) a torrefaction process, or 3) any combination of the two, comprising:

the biomass composition of matter is in a particle form and is created in a pretreatment step that occurs prior to the biomass gasification reaction or torrefaction process, where the biomass initially has a bulk structure including organic polymers of lignin that surround a plurality of cellulose fibers in a fiber bundle, where the bulk structure of the biomass composition of matter is 1) stripped apart biomass to at least partially separate an outer layer of lignin from the cellulose fibers, 2) internally blown apart biomass to create fragments of the fiber bundle, and 3) any combination of the two, wherein the pretreatment step uses at least moisture, pressure, and heat to liberate and expose the cellulose fibers to be able to react in a two-stage sequence during the biomass gasification reaction rather than react in a repeating cycle of multiple layers of lignin followed by the cellulose and hemicelluloses, and wherein the biomass composition of matter in particle form has a length to thickness aspect ratio on average of less than 300 to 1, a thickness on average of less than 100 microns thick and a length on average of less than 3000 microns, and

wherein the bulk structure of the biomass composition of matter in particle form that has been either i) stripped apart or ii) internally blown apart and has the length to thickness aspect ratio on average of less than 300 to 1, the thickness on average of less than 100 microns thick and the length on average of less than 3000 microns is configured to cause the decomposition of the large organic molecules making up the biomass composition of matter when undergoing the two-stage sequence

in the biomass gasification reaction at an elevated heat of greater than 700 degrees C to react during the biomass gasification reaction to produce a reaction product of resultant stable ash formation, a complete amelioration of tar to less than 500 milligrams per normal cubic meter, and a yield of at least 90% of the biomass composition of matter in particle form into reaction products including the stable ash, and the hydrogen, the carbon monoxide and carbon dioxide gaseous products.

Appellants (App. Br. 9) request review of the following rejections from the Examiner's Final Office Action:

I. Claims 1–7 and 10–17 rejected under 35 U.S.C. § 103(a) as unpatentable over Medoff (US 2009/0286295 A1, published November 19, 2009), McMillan (James D. McMillan, *Pretreatment of Lignocellulosic Biomass*, Enzymatic Conversion of Biomass for Fuels Production Chapter 15 (ACS Symposium Series), 1994, pp. 292–324), and Asadullah (Mohammad Asadullah, Shin-Ichi Ito, Kimio Kunimori, Muneyoshi Yamada and Keiich Tomishige, *Energy Efficient Production of Hydrogen and Syngas from Biomass: Development of Low-Temperature Catalytic Process for Cellulose Gasification*, Environ. Sci. Technol., 2002, 36, pp 4476–4481).

II. Claims 8 and 18 rejected under 35 U.S.C. § 103(a) as unpatentable over Medoff, McMillan, Asadullah, and Obae (US 2011/0064805 A1, published March 17, 2011).

III. Claim 20 rejected under 35 U.S.C. § 103(a) as unpatentable over Medoff, McMillan, Asadullah, and Burke (US 2010/0024806 A1, published February 4, 2010).

For Rejection I, Appellants indicate that the respective composition of matter claims 1–7 and 10 and the respective method claims 11–17 stand or fall together. App. Br. 9. Further, in arguing the method claims, Appellants rely on the arguments presented when discussing independent claim 1. *Id.* at 50. In addition, Appellants rely on the arguments presented when discussing claim 1 to address the separate rejections of claims 8, 18 (Rejection II) and

20 (Rejection III). *Id.* at 50–51. Appellants do not address or further distinguish the additionally cited secondary references in these separate rejections based on the additional limitations of the respectively rejected claims. *Id.* Accordingly, we select claim 1 as representative of the subject matter before us on appeal. Claims 2–8, 10–18, and 20 stand or fall together with representative claim 1.

OPINION

Claim 1

After review of the respective positions provided by Appellants and the Examiner, we AFFIRM the Examiner’s rejection of representative claim 1 for the reasons presented by the Examiner. We add the following for emphasis.

Claim 1 is directed to a pretreated biomass in particle form comprising fragments of a cellulose fiber bundle where the fragments have a length to thickness aspect ratio on average of less than 300 to 1, a thickness on average of less than 100 microns thick and a length on average of less than 3000 microns.² The claimed dimensions of the pretreated biomass in particle form also provide the property of decomposing large organic molecules making up the biomass composition of matter into smaller molecules to create syngas components when undergoing the two-stage sequence in the biomass gasification reaction. App. Br. 12–14.

² Both Appellants and the Examiner principally discuss the embodiment of the biomass in particle form that is created by pretreatment using steam explosion, which is associated with the claimed embodiment of internally blown apart biomass fragments of a fiber bundle. Spec. ¶¶ 4, 14, 34, 36; Final Act. 5–6; App. Br. 42. Accordingly, we focus our discussion on this particular embodiment.

The Examiner found Medoff discloses a cellulose particle (pretreated biomass composition of matter in particle form) having an average length to diameter ratio of greater than 8:1 (*cf.* claimed average length to diameter ratio of less than 300 to 1), an average width (diameter or thickness) of between about 5 to 50 microns (*cf.* claimed width of less than 100 microns) and an average length of between about 0.5 to 2.5 mm (*cf.* claimed average length of less than 3000 microns, which converts to less than 3 mm) produced by pretreating biomass, such as wood comprising cellulose, hemicellulose and lignin, via steam explosion. Final Act. 5³; Medoff ¶¶ 110, 113, 138, 144, 171, 367. The Examiner found Medoff's average length to diameter ratio, average width, and average length either overlap or encompass the claimed ranges for each of these limitations. Final Act. 5. The Examiner also found Medoff discloses this particle as useful for gasification processes. Final Act. 5; Medoff ¶ 406. The Examiner determined that, absent a showing to the contrary, Medoff's biomass in particle form appears to be substantially identical to the claimed biomass in particle form. Final Act. 4; Ans. 35–36.

Appellants argue the Examiner has not provided evidence that Medoff's biomass in particle form possesses the property of decomposing

³ A discussion of the references to McMillan and Asadullah is unnecessary for disposition of this appeal. The Examiner relied on McMillan principally as evidence that the structure of Medoff's biomass in particle form includes lignin surrounding cellulose fibers, numerous methods for the pretreatment of lignocellulosic biomass including mechanical comminution, various explosion methods and acid hydrolysis. Final Act. 6; McMillan 293–298, 300–317. The Examiner relied on Asadullah to teach a gasification process. Final Act. 6–7; Asadullah 4481. These references are not relied upon to address the specific structure of the claimed biomass in particle form.

large organic molecules making up the biomass composition of matter into smaller molecules to create syngas components when undergoing the two-stage sequence in a biomass gasification reaction, as claimed. App. Br. 13. According to Appellants, when the biomass composition of matter in particle form has structural characteristics exposing the internal layers of the chemical compound of biomass and breaking down some of physical and chemical bonds in the chemical compound and has particle dimensions as claimed, then this biomass composition of matter in particle form also has the characteristic of producing different chemical reaction products at a different yield/conversion rate when undergoing the specific chemical reaction (biomass gasification) associated with this property in the claim. *Id.* at 13–14, 19–20. Thus, Appellants argue the biomass in particle form of the prior art does not exhibit this characteristic. *Id.* at 23.

We are unpersuaded by these arguments for the reasons presented by the Examiner. Ans. 36–37. The mere recitation of a property or characteristic not disclosed by the prior art does not necessarily confer patentability. *In re Dillon*, 919 F.2d 688, 693 (Fed. Cir. 1990) (“There is no question that all evidence of the properties of the claimed compositions and the prior art must be considered in determining the ultimate question of patentability, but it is also clear that the discovery that a claimed composition possesses a property not disclosed for the prior art subject matter, does not by itself defeat a *prima facie* case.”).

[W]here the prior art gives reason or motivation to make the claimed [invention], . . . the burden (and opportunity) then falls on an applicant to rebut that *prima facie* case. Such rebuttal or argument can consist of a comparison of test data showing that the claimed compositions possess unexpectedly improved properties or properties that the prior art does not have

Id. at 692–93.

As shown above, the Examiner established that Medoff discloses a biomass in particle form having ranges for its dimensions that either encompass or overlap the claimed ranges for the same dimensions. Final Act. 5; Medoff ¶ 144. In addition, the Examiner established that, like Appellants, Medoff discloses that the biomass in particle form can be created via steam explosion. Final Act. 5; Medoff ¶¶ 110. Thus, the Examiner has provided a reasonable basis to establish that the biomass in particle form of the claimed invention appears to be structurally similar to the biomass in particle form of the prior art. *Dillon*, 919 F.2d at 692–93. Given Medoff’s disclosure that steam explosion produces fibrous material (that is, fragments) and that such pretreated biomass material is useful in gasification processes that produce syngas (Medoff ¶¶ 110, 368–369, 372–373, 406–409), there is a reasonable basis for one skilled in the art to expect Medoff’s biomass in particle form to possess the claimed characteristic of producing different chemical reaction products at a different yield/conversion rate when undergoing the specific chemical reaction (biomass gasification) associated with this property.

Accordingly, the burden is properly shifted to Appellants to demonstrate that the claimed property or characteristic was not possessed by the prior art. Appellants have not adequately explained or directed us to evidence showing why Medoff’s biomass in particle form does not necessarily or inherently possess the disputed property.

Appellants argue Medoff does not disclose particles of biomass where lignin and cellulose exist but are separated. App. Br. 19, 38–39. We find this argument unavailing. As previously indicated, Medoff utilizes a steam

explosion process to create the fiber source, which is one of the processes used and disclosed by Appellants. Medoff ¶¶ 367, 370; Spec. ¶ 2.

Appellants have not adequately explained why Medoff's steam explosion process of pretreating a biomass would not result in fragments from a fiber bundle. Appellants have not adequately explained how Medoff's steam explosion process is different from Appellants' disclosed steam explosion process or why it would yield a different biomass in particle form.

Moreover, the claimed embodiment where internally blown apart biomass is created only requires creation of fragments of the fiber bundle without specifying the presence of specific components of the fiber bundle.

Appellants' assertion that Medoff discloses chemically removing the lignin from the biomass material is equally unavailing. App. Br. 38. The portion of Medoff relied upon by Appellants in support of this assertion states that, if desired, lignin can be removed from any of the fibrous materials that include lignin. Medoff ¶ 138. At best, this portion suggests an alternative, perhaps preferred, embodiment disclosed by Medoff. It is well settled that a reference may be relied upon for all that it discloses, including non-preferred embodiments. *Merck & Co. v. Biocraft Labs., Inc.*, 874 F.2d 804, 807 (Fed. Cir. 1989) ("all disclosures of the prior art, including unpreferred embodiments, must be considered" (quoting *In re Lamberti*, 545 F.2d 747, 750 (CCPA 1976))). The disclosed examples and preferred embodiments do not constitute a teaching away from a broader disclosure or non-preferred embodiments. *In re Susi*, 440 F.2d 442, 446 n.3 (CCPA 1971).

Thus, Appellants have not pointed to error in the Examiner's determination of obviousness.

Accordingly, we affirm the Examiner's prior art rejection of claims 1–7 and 10–17 under 35 U.S.C. § 103 (a) (Rejection I) as well as the separate prior art rejections of claims 8, 18, (Rejection II) and 20 (Rejection III) for the reasons presented by the Examiner and given above.

DECISION

The Examiner's prior art rejections of claims 1–8, 10–18, and 20 under 35 U.S.C. § 103(a) are affirmed.

TIME PERIOD

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1).

AFFIRMED